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ABSTRACT

Production data from a longitudinal study of seven children in their first attempts to produce words containing fricatives are presented to illustrate how children use four distinct strategies to approach this relatively difficult class of sounds. The strategies are: (1) favorite sounds--an approach used by a subject who seemed to enjoy playing with different ways to say words containing mid to back fricatives and affricates; (2) avoidance--used by three subjects and characterized by the failure of a child to produce certain sounds and the child's refusal to learn adult words containing the problem sounds until a dramatic reversal of the avoidance strategy brings on an exponential growth in fricative production; (3) syllable fricative--a strategy used by three subjects involving the vowelless production of words containing fricatives; and (4) word position--an approach exemplified by three subjects where fricatives are produced in postvalic or final position. The four strategies provide ways for the child to concentrate on a certain class of sounds and to use them in situations where they might be easier to produce. The strategies are less than clearly related to further phonological development and even less related to resulting adult phonologies. Tabular data are included. (EJS)

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SOME STRATEGIES IN THE EARLY PRODUCTION OF FRICATIVES*

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1. Introduction

There has been a shift in interest in recent language acquisition study on two related fronts. First, there has been a shift from the study of the contents of grammars and rule writing to a study of strategies and approaches to language learning. At the same time, while still assuming that much of language development is constrained by cognitive and language universals, researchers have shifted the focus of their attention from summaries of the similarities of development to individual differences and the range of variation allowed by whatever constraints there might be.

In this paper I would like to illustrate the different strategies used by several children in their first attempts to produce words containing fricatives. Fricatives can be considered a relatively difficult class of sounds. They do not usually occur in the earliest language production, some are learned very late in phonological development, and they present articulation problems well into school age. Production data from children under two years of age are presented here to illustrate how children approach this class of relatively hard sounds. The different approaches can be termed "strategies."

The word strategy has been used as a cover term for a wide variety of phenomena (as noted disapprovingly by Cruttenden, 1976). In general, all the things which have been called strategies are ways in which a child has taken an active organizational role in determining the structure of his language. Usually the discussion has been aimed at naming certain modal strategies in an either-or relationship. For example, it has been claimed that either the child uses reduplication or the child prefers single, closed syllables (Ferguson, Peizer & Weeks, 1973); either the child uses functional operators in early two-word utterances or the child prefers content words (Bloom, Lightbown & Hood, ms.); either nouns or manipulatory words are preferred in early vocabulary (Nelson, 1973).

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The phenomena I am going to describe are not quite as neat. Some children do not show any particular approach to fricatives as a class. Others use one or more of the strategies to be discussed, and it is quite possible that there are other fricative strategies yet to be discovered. At any rate, these phenomena, involving as they do the child's active organization of his language, deserve to be called strategies.

In the following sections, I will first summarize the fricative development of these children, then outline the strategies discovered, and finally discuss the contribution of strategies to language development.

2. Fricative development

As part of a longitudinal study, the seven subjects listed in Table I were visited in their homes every week or so and taped for about one-half hour. Each subject was reported to say 3-10 words at the beginning of the study. We attempted to keep track of vocabulary growth and to elicit as many forms as possible with parental help.

Table I

	Child	Sex	Age Range	# of visits
1.	TW*	F	11-18 months	23
2.	KF*	F	14-21 months	22
3.	KL	F	11-21 months	31
4.	MF	F	13-20 months	18
5.	JJ	M	13-20 months	19
6.	JB	M	13-20 months	24
7.	JM	M	12-19 months	20

* Production data from the first few visits to TW and KF were described in Ferguson & Farwell (1975)

Although a general analysis of fricative development is still underway, an idea of the range of development covered can be found from the fricative production system for each child at the end of the study as shown in Table II. Those adult fricatives which the child produces as fricatives are indicated by arrows giving the adult sound and corresponding child rendition, e.g. (adult) ʃ

(child) ↓ s

The symbol θ ~ s indicates that a sound is produced sometimes as one, sometimes as the other of these sounds. A fricative said to be "stopped" is produced as a stop, e.g. ð as d. (Ingram, 1974). Those sounds said to be "not common" are not present in sufficient numbers to be included in the table.

Table II

Sounds studied: f θ s ʧ ʃ
v ð z ʤ ʒ

Fricative Systems of Subjects at the End of Study

Subject	Initial forms	Final forms
1. TW	f s ʃ ʧ ʤ f ʃ ʧ ʤ θ → ð stopped others not common	f θ s z ʃ ʧ f s s s~ʃ ʃ ʧ others not common
2. KF	f ð s z ʃ ʧ ʤ f ð~d s~ʃ s ʃ~ʧ ʧ ʤ others not common	θ s z ʃ ʧ θ~s s z~s ʃ ʧ others not common
3. KL	ʃ ʤ ʃ ʤ ð → s stopped others not common	f s z ʃ f f~s~ʃ ʃ~s ʃ~f~s others not common
4. MF	f s ʃ f s s θ, ð, ʧ → ʤ stopped others not common	deleted, as are all final consonants.
5. JJ	s s ð stopped others not common	s z s s others deleted
6. JB	f s ʃ ʧ f s ʃ ʧ~ʃ ð stopped others not common	f s z ʃ f s s ʃ~s others not common
7. JM	f s ʃ w s ʃ θ → ð stopped others not common	z s others not common

A quick glance shows that these children generally conform to predictions about fricative development in papers such as Ferguson (1975), Ingram (to appear), Menn (1973) and Moskowitz (1975). For instance, voiceless fricatives, and most particularly f, s & ʃ, are the first controlled. The data being studied also show that stops are usually learned before the corresponding fricatives, and substitutions which occur are in the expected directions--towards stops, other continuants, or similar fricatives. In summary, these children, both individually and as a group, appear to be following a normal path of fricative development: some have learned many more of the sounds than others, but in general they can be said to be following the rules suggested in recent studies.

3. Strategies

A closer look at the way these children begin to learn to say fricatives reveals some individual differences not readily apparent from a display of data such as that in Table II. In this section, I would like to discuss four approaches used by children in gaining control over fricative production: Favorite sounds, Avoidance, Syllabic fricative and Word position.

3.1 Favorite sounds

This approach is used by TW. TW included a number of words in her very early vocabulary which contained mid to back fricatives and affricates, and she almost always produced them with sounds in that same range. The words involved among her first 50 words included see, fish, shoes, cereal, cheese, eyes, ice and juice. Note that these words tend to have high vowels and to have fricatives as their only consonants (except cereal in which liquids are allowed). She seemed to enjoy playing with different ways to say these words and she repeated them often. For instance, in one session juice was produced in the following ways:

[ʃˌuˢ, ʃˌɪʃ, dɹuɸ, dʒuɸ, ʧ utʃ u̥, ʧ iʃˌ, ʃiuʃ]

Her concentration on this group of sounds is especially interesting when compared with the generally limited inventory of sounds she could produce at this time.

3.2 Avoidance

This approach is exemplified by JB although MF and JJ also used it to some extent. Avoidance is characterized both by the failure of a child to produce certain sounds and by the child's refusal to learn adult words containing the problem sounds. For example, Ferguson & Farwell (1975) show that TW avoided learning words beginning with p although she freely expanded her set of words beginning with b. Many children avoid words containing fricatives for some time in their early language.

Avoidance is best illustrated by our child JB because of the dramatic turnabout which occurs when it ends. This reversal of the avoidance strategy might be called "acceptance". For two months, JB said virtually

no fricative words. For another two months, he produced only one fricative word with regularity. But then, he began to learn fricative words and within a month 50-60% of the words he produced contained fricatives (this high percentage not due to frequent use of the plural morpheme). Almost all these fricative words were indeed produced with fricatives, and fricatives were overextended--boo was produced for some time as boof.

JB's growth of vocabulary in this area seemed almost exponential. If one week he produced his first word beginning with fl-, the next week there would be four more. Unfortunately, our study ended before we could find out how JB would manage to end this spree.

3.3 Syllabic fricative

This approach is exemplified by MF. KL and TW also used it to some extent. MF had a strictly rule governed phonology. She used only CV, reduplicated CV and VCV canonical forms, and since her sound inventory was small and her vocabulary large, she had many homonyms.

For two months (10 sessions) only four adult fricative words occurred in her production, only one more than once. Then MF began to produce fricative words as mid to back fricatives and affricates without a vowel--as something that might be called syllabic fricatives. She used this method for sheep, shoe, juice, chip, chicken, zebra, fish and flower (the last two with f, but only when f+vowel also began to appear). Gradually she learned to say the same words with vowels, although some remained as syllabic fricatives for a month. As with her other words, these vowelless words were sometimes homonyms.

I thought this an idiosyncratic way of learning fricatives until last year when, in another study, I found a child, Amy, who had adopted the same strategy, using it for the words cheese, juice and shoe. Of course, Hildegard Leopold had sch as an early word, and many children learn the hushing sound early. A long f without a vowel is noticeably less successful than ʃ and the affricates, no doubt because it is nearly inaudible. KL tried to say f this way early in development, but gave up and did not learn f words for several months.

Fricatives seem more amenable to vowelless production than most other sound classes. For one thing, they can be made to last as long as a syllable, and they are audible. Although children sometimes practice stops without vowels, I know of no cases in which stops without vowels are used as regular word renditions. This phenomenon is related to one found in Waterson (1971). All of her subject's "phonological structures" contained words of two syllables with the second syllable open, except the sibilant structure which consisted of one syllable words closed by ʃ. Thus, the final fricative seems almost to compensate for the lack of a second syllable. As a further possible bit of evidence, consider the fact that one of the children in this study produced vowel off-glides when deleting final ʃ. Thus, high vowels interact in rules with fricatives such as ʃ giving further possible evidence of the syllabic nature of fricatives.

After MF learned fricative words, she began to apply rules of voicing and stopping, and after mastering these rules, she cut not only the number of fricatives produced but also the number of fricative words attempted. It is as though she has done fricatives and is moving on.

3.4 Word position

This approach is exemplified by JB, KL and KF. As Ferguson (1975) has discussed, fricatives have shown themselves to be easier to produce in postvocalic or final position. Children make use of this fact in various ways.

JB produces his first regular fricative in final position and begins to explore the range of fricatives there before attempting them in initial position. This is particularly striking since other final consonants are usually deleted or avoided altogether.

KL expands her fricative vocabulary only after learning to produce final consonants. When the possibility of final fricatives is opened to her, she learns 23 words containing them in a few weeks.

KF sometimes follows a rule which seems to require that if a fricative is produced, it must go at the end of the word, producing forms similar to Hildegard Leopold's [doɪʃ] for story.

Although these three uses of the word position strategy are very different, they all make use of the fact that fricatives are best produced at the end of a word in their organization of the language.

4. Discussion

All four strategies described above provide a way for the child to concentrate on a certain class of sounds and to use them in situations where they might be easier to produce. The relation between these approaches and phonological development is somewhat unclear. For one thing, the subsequent reduction of the surface fricative system shown by MF raises the question of the relation between surface elaboration and phonological rule elaboration. Not only does MF reduce former fricative sounds by voicing and stopping as discussed above (3.3) but she switches to s as her only non-front fricative sound by the end of the study, a sound never heard during the syllabic fricative period.

It often seems to happen that acquisition of a rule like stopping results in the reduction of the surface inventory of sounds, while the strategies discussed here are aimed at increasing that surface inventory. One might want to claim that rule learning represents phonological development, while learning to produce fricatives using these strategies represents only phonetic learning (cf. Moskowitz 1975). However, these two kinds of learning interact crucially at the level of the word (cf. Ferguson & Farwell 1975). All of these strategies involve learning a number of new words containing fricatives, and without these words in the child's inventory, (s)he could not be said to have fricatives as part of the underlying phonological system, which would be necessary for input to rules such as stopping. Moreover, some children apparently

never learn such rules, but instead maintain the surface fricatives learned by these strategies. On the other hand, some children, such as A (Smith 1973), apparently learn fricative words without ever saying fricatives, by applying such rules to their first productions of the words. Clearly, more work is required before we fully understand the relationships between these factors.

To summarize, the strategies discussed here appear to facilitate development by enabling children to deal with fricative words. They are less clearly related to further phonological development, and even less related to resulting adult phonologies (as pointed out by Ferguson, Peizer & Weeks, 1973).

If we are really interested in language acquisition, we must study more than the generalizations which can be made about language development summed across children. We must also learn just what methods a child may use to attack the problem of learning--such methods are at least a hint at the form of any language acquisition system that may be being employed.

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